Trend Study 13B-5-05

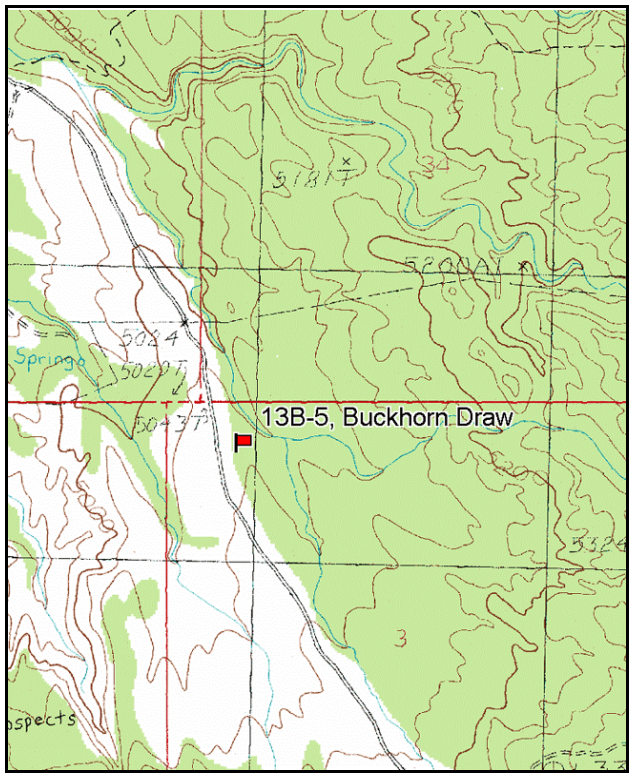
Study site name: Buckhorn Draw . Vegetation type: Desert Shrub .

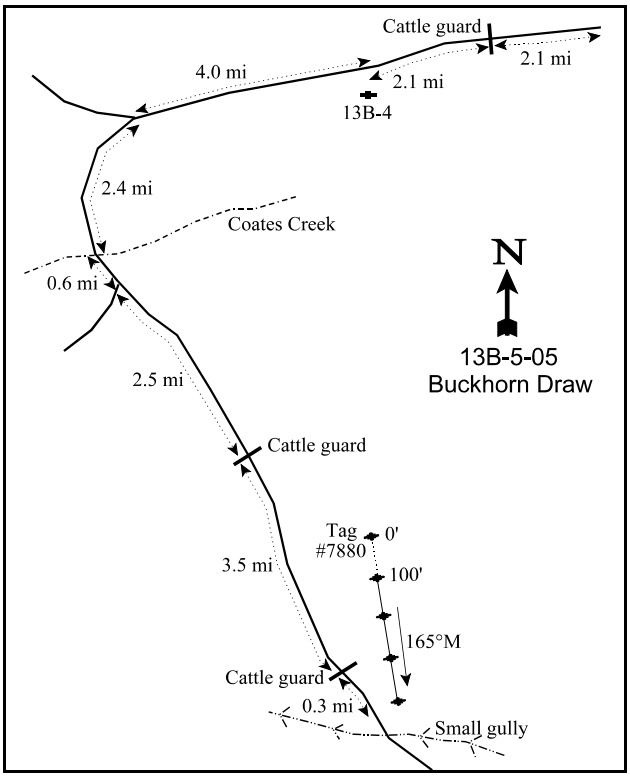
Compass bearing: frequency baseline 165 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the Utah-Colorado state line west of Glade Park travel 2.1 miles to a cattle guard. Continue west 2.1 miles to the Red Cliffs transect(13B-4). Continue west on the main road 4.0 miles to a fork. Stay left and go 2.4 miles to Coates Creek. Cross the creek and continue 0.6 miles to a fork. Stay left, go 2.5 miles to a cattle guard. Proceed 3.5 miles to another cattle guard. Go 0.3 miles past the cattle guard and stop. The transect is on the left (east) side of the road. The 0-foot end of the baseline (found 400 feet north) is also marked by a fence post, tagged #7880. All other plot markers are short rebar stakes.





Map Name: Blue Chief Mesa

Diagrammatic Sketch

Township 23S , Range 25E , Section 3

GPS: NAD 27, UTM 12S 4300371 N, 660934 E

DISCUSSION

Buckhorn Draw - Trend Study No. 13B-5

The Buckhorn Draw site is a open bench at an elevation of about 5,100 feet. It is gently sloping (8%) to the north. Deep washes to the east and west intermittently carry water and drain to the north. The area supports a mixed desert shrub community dominated by broom snakeweed, Wyoming big sagebrush, spiny hopsage and perennial grasses with some scattered junipers. It is grazed by cattle and used as winter range for deer and elk. The area is within the Buckhorn allotment. This is a very large allotment consisting of 12 pastures. Grazing occurs on a deferred rotational basis from October 1 to May 30 using a holistic grazing plan of high intensity and short duration. In 1986, the BLM estimated use of sagebrush to be heavy (60%-80%), but much of this could be cow use, because it is a winter cattle allotment. Deer pellet groups were scattered throughout the area at moderate levels as well as moderate numbers for rabbit, with low counts for cattle and very low numbers for elk. Pellet-group data from 2000 estimated 1 elk day use/acre (<1edu/ha), 27 deer days use/acre (11 ddu/ha), and 20 cow days use/acre (8 cdu/ha). Pellet-group data in 2005 estimated 3 elk, 20 deer, and 6 cow days use/acre (8edu/ha, 50 ddu/ha, and 16 cdu/ha).

The soil is a fine sandy loam, well drained, and deep with an effective rooting depth of 19 inches. There is a compacted layer of fine silty sand at about 12 inches with a noticeable accumulation of calcium carbonate. The soil reaction is mildly alkaline (pH 7.6). The amount of phosphorus in the soil is low at only 2.3 ppm, where levels below 6 ppm may hinder normal plant growth and development in wildland soils (Tiedemann and Lopez 2004). Percent bare ground decreased between 1986 to 1995. However, with severe drought, relative percent bare soil increased to a high of 50% in 2000, which decreased to 31% in 2005. Protective ground cover constituted an almost equal percent of vegetation and litter until 2005, when vegetation far exceeded litter. Most of the vegetation cover consisted of grasses, especially cheatgrass. No rock or pavement cover was encountered on the site. The gentle slope mitigates erosion from becoming excessive, although there is one small gully running southwest of the study site. The erosion condition class determined soil movement as slight in 2005 due to excessive pedestaling around shrubs and perennial grasses as well as some soil movement between perennial species.

The key browse species are Wyoming big sagebrush and spiny hopsage. In 1986, Wyoming big sagebrush had about as many decadent plants as mature plants in the population and use was extremely heavy with 87% of the plants sampled exhibiting heavy hedging. Then in 1995, there was a higher proportion of mature plants and a decreased percentage of decadent plants (from 40% in 2000 to 12%). In 1995, one-third of the population was classified as young with a slightly higher proportion of seedlings compared to 1986. Mature plants also increased in height and crown measurements nearly doubled. In 1995 and 2000, density increased 12% from 1,020 plants/acre to 1,160 plants/acre. Use was mostly light to moderate with heavy use at only 6%-9%. The mature individuals increased from 55% in 1995 to 76% in 2000, with a decrease of decadent individuals from 12% to 9%. From 2000 to 2005, the population decreased by 43%, mature individuals decreased to 39% of the population, and the number of decadent individuals increased to 39%. The dying population decreased from 8% in 1995 to 2% in 2000, to 15% in 2005. Despite this increase in dying individuals, recruitment of young individuals represented 21% of the population in 2005.

The spiny hopsage population has been mature with moderate to heavy hedging and high decadence. In exceptionally dry years, spiny hopsage tends to lose its leaves which makes it difficult to determine its true condition. Vigor was classified as poor on all plants sampled in 1986. In 2000, only about one-forth of the plants sampled displayed poor vigor. Spiny hopsage is utilized primarily in the spring by livestock and wildlife with its usefulness decreasing as the summer progresses. In 2005, the spiny hopsage population decreased 20%, although the percentage of mature individuals increased and the percentage of decadent individuals decreased. Broom snakeweed was the most abundant browse species until 2005, when it decreased from 4060 plants/acre in 2000 to 440 plants/acre. Other less abundant shrubs include: cactus, green ephedra, and blackbrush. Junipers

are scattered throughout the area with the point-center quarter method estimates of only about 28 trees/acre in 2000 and 25 trees/acre in 2005.

Historically, sand dropseed provided most of the perennial herbaceous cover on this site with 5% cover in 1995 and 7% in 2000, but had decreased to nearly nothing by 2005. The other common perennial grass was three-awn, a warm season grass that has poor forage value most of the year. It is an increaser and most often indicates long term range deterioration. A small amount of Indian ricegrass has been present also. Cheatgrass provided 36% of the grass cover in 1995 with a 100% quadrat frequency. In 2000, because of a lack of precipitation the previous year, it provided only about 20% of the grass cover and had a quadrat frequency of only 86%. In 2005, perennials declined to less than 1% cover and cheatgrass increased to 38% cover (quadrat frequency of 100%). All forbs combined contributed less than 1% total cover before 2005, but contributed 2% in 2005.

1986 APPARENT TREND ASSESSMENT

The deteriorating population of the palatable spiny hopsage is an indication of a future downward browse trend. Sagebrush vigor is generally good, but this species may be harmed by increasing future use as hopsage becomes unavailable. Broom snakeweed is likely to increase, but numbers of this species fluctuate so much with precipitation they are not a good indicator of trend. Little soil movement is detectable, although there is a large amount of bare soil in the shrub interspaces. There is room for improvement in litter and vegetation cover. The soil trend appears to be stable at this time.

1995 TREND ASSESSMENT

The relative amount of bare soil has decreased since 1986, but is still moderately high. No signs of erosion are present now, but this is more likely due to the almost level terrain of the site which lends itself to a more stable soil trend. Although there is ample grass cover, most of the grasses are increasers or invaders. Since the nested frequency for perennial grasses has stayed nearly the same and forbs comprise less than 3% of the vegetation cover, the herbaceous understory is stable but characterized by a poor species composition. The browse trend is slightly up with a more vigorous spiny hopsage population. The Wyoming big sagebrush population has fewer decadent plants and a higher proportion are classified as young plants. The broom snakeweed population should be monitored and could easily increase with poor management. The Desirable Components Index rated this site as fair with a score of 28 due to fair perennial grass cover, low perennial forb cover, low recruitment of shrubs, low browse cover, high shrub decadence, and low annual grass cover.

TREND ASSESSMENT
soil - stable (0)
browse - slightly up (+1)
herbaceous understory - stable (0)
winter range condition (DC Index) - Fair (28) Lower Potential scale

2000 TREND ASSESSMENT

Trend for soil is slightly down. The ratio of protective ground cover (vegetation, litter and cryptogams) to bare ground decreased. The amount of bare soil increased slightly from 39% to 50%. This slightly downward soil trend is due to an increase in the amount of bare ground and decreases of vegetation and litter cover. However, there are no signs of erosion present, but this is more likely due to the well drained characteristics of the sandy soil and almost level terrain of the site. The browse trend is stable with improvement to Wyoming big sagebrush but spiny hopsage is slightly down. The broom snakeweed population should be monitored and could easily increase with poor management. The herbaceous understory trend is slightly up. The nested frequency of perennial grasses increased very slightly and the nested frequency of cheatgrass decreased significantly (33%). The nested frequency of perennial forbs decreased, but perennial forbs are in such small numbers and are of

little importance on this winter range. The Desirable Components Index rated this site as fair with a score of 34 due to fair perennial grass cover, low perennial forb cover, low recruitment of shrubs, low browse cover, high shrub decadence, and low annual grass cover.

TREND ASSESSMENT
soil - slightly down (-1)
browse - stable (0)
herbaceous understory - slightly up (+1)
winter range condition (DC Index) - Fair (34) Lower Potential scale

2005 TREND ASSESSMENT

The soil trend is up. The ratio of protective ground cover (vegetation, litter and cryptogams) to bare ground increased substantially. This is due to a decrease in bare ground as well an increase of cryptogamic crust cover. The majority of the soil trend is due to an increase in annual vegetation, which is caused by a drastic increase of cheatgrass. Although cheatgrass cover and nested frequency are very ephemeral and dependent upon precipitation, it does help prevent erosion. The trend for browse is down. The individual trends for both key browse species, Wyoming big sagebrush and spiny hopsage, are down. Wyoming big sagebrush declined 43% in density from 2000 to 2005 from 1,160 to 660 plants/acre. This is coupled with an increase of decadent plants from 9% of the population in 2000 to 39% in 2005. The percentage of the population classified as dying also increased from 2% in 2000 to 15% in 2005. An increase of young plants in the population, which represented 16% of the population in 2000, increased to 21% in 2005. This may provide enough recruitment for the population to increase. The browse species highest in numbers in 2005 was spiny hopsage. This population has also decreased from 1,020 plants/acre in 2000 to 820 in 2005, a 20% decrease. In contrast to this drastic population decrease, the percentage of the population classified as mature increased from 12% in 2000 to 51% in 2005. Decadence decreased from 88% in 2000 to 49% in 2005 and the plants classified as dying also decreased from 24% in 2000 to 20% in 2005. This change from decadent and dying individuals is likely a product of leaf drop during the 2000 reading. The trend for herbaceous understory is down. This is due mainly to a 60% increase in the nested frequency of annual grasses from 2000 to 2005, 59% of which is due to an increase in cheatgrass. This is coupled with a 87% decrease (from 2000 to 2005) in the nested frequency of perennial grasses like purple-three-awn, Indian ricegrass, and sand dropseed. Annual forb nested frequency increased by nearly five times from 2000 to 2005. Perennial forbs increased, but made up a minuscule percentage of the herbaceous understory and are a less-important component of this winter range. The Desirable Components Index rated this site as very poor with a score of -4 due to very poor perennial grass cover, very poor perennial forb cover, low recruitment of shrubs, low browse cover, very high shrub decadence, and very high annual grass cover.

TREND ASSESSMENT
soil - up (+2)
browse - down (-2)
herbaceous understory - down (-2)
winter range condition (DC Index) - Very Poor (-4) Lower Potential scale

HERBACEOUS TRENDS --
Management unit 13B, Study no: 5

Type	Species	Nested Frequency				Average Cover %		
		'86	'95	'00	'05	'95	'00	'05
G	Aristida purpurea	$_{b}$68	$_{b}$73	$_{b}$75	$_{a}$-	2.42	3.20	-
G	Bromus tectorum (a)	-	$_{b}$353	$_{a}$237	$_{c}$376	4.07	2.65	38.47
G	Oryzopsis hymenoides	$_{ab}$18	$_{b}$35	$_{b}$32	$_{a}$7	.20	.46	.03
G	Sporobolus cryptandrus	$_{b}$156	$_{b}$137	$_{b}$160	$_{a}$27	4.66	6.79	.17
G	Vulpia octoflora (a)	-	20	18	31	.04	.07	.06
Total for Annual Grasses		0	373	255	407	4.11	2.72	38.53
Total for Perennial Grasses		242	245	267	34	7.28	10.46	0.20
Total for Grasses		242	618	522	441	11.40	13.18	38.73
F	Calochortus nuttallii	-	-	4	-	-	.00	-
F	Cryptantha sp.	-	$_{b}$24	$_{a}$-	$_{a}$1	.05	-	.00
F	Cymopterus sp.	-	$_{a}$6	$_{a}$14	$_{b}$35	.01	.03	.07
F	Erodium cicutarium (a)	-	$_{a}$5	$_{ab}$12	$_{b}$16	.01	.03	.62
F	Eriogonum sp.	-	$_{b}$15	$_{a}$-	$_{a}$-	.03	-	-
F	Gilia sp. (a)	-	-	3	-	-	.00	-
F	Lappula occidentalis (a)	-	-	1	-	-	.00	-
F	Lepidium densiflorum (a)	-	$_{b}$37	$_{a}$3	$_{c}$55	.08	.00	.17
F	Lygodesmia grandiflora	-	7	3	3	.04	.00	.15
F	Navarretia intertexta (a)	-	-	-	1	-	-	.00
F	Plantago patagonica (a)	-	$_{b}$147	$_{a}$29	$_{b}$146	.32	.06	.46
F	Sphaeralcea coccinea	-	$_{b}$19	$_{a}$-	$_{a}$3	.06	-	.01
Total for Annual Forbs		0	189	48	218	0.41	0.10	1.27
Total for Perennial Forbs		0	71	21	42	0.19	0.04	0.23
Total for Forbs		0	260	69	260	0.61	0.15	1.51

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 13B, Study no: 5

Type	Species	Strip Frequency			Average Cover %		
		'95	'00	'05	'95	'00	'05
B	Artemisia tridentata wyomingensis	31	28	20	.82	1.63	1.04
B	Coleogyne ramosissima	3	5	6	-	1.63	1.01
B	Grayia spinosa	33	28	27	3.76	4.67	3.93
B	Gutierrezia sarothrae	65	71	15	3.95	1.60	.37
B	Opuntia sp.	4	8	8	.06	.33	.31
B	Sclerocactus sp.	0	1	0	-	-	-
Total for Browse		136	141	76	8.60	9.89	6.67

CANOPY COVER, LINE INTERCEPT --
Management unit 13B, Study no: 5

Species	Percent Cover '05
Artemisia tridentata wyomingensis	.30
Coleogyne ramosissima	1.38
Grayia spinosa	3.61
Gutierrezia sarothrae	.08
Opuntia sp.	.21

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 13B, Study no: 5

Species	Average leader growth (in) '05
Artemisia tridentata wyomingensis	1.6
Coleogyne ramosissima	1.5
Grayia spinosa	3.5

POINT-QUARTER TREE DATA --
Management unit 13B, Study no: 5

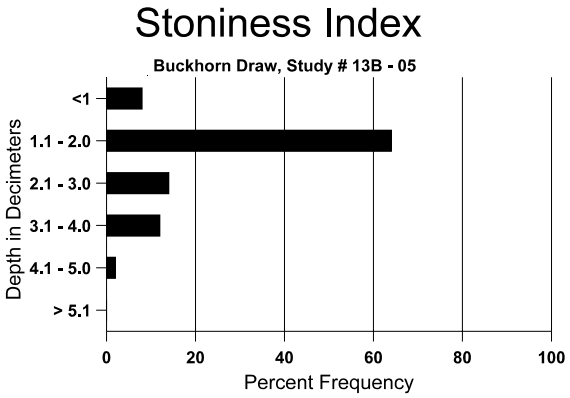
Species	Trees per Acre		Average diameter (in)	
	'00	'05	'00	'05
Juniperus osteosperma	16	25	8.6	13.5

BASIC COVER --
Management unit 13B, Study no: 5

Cover Type	Average Cover %			
	'86	'95	'00	'05
Vegetation	8.50	24.78	23.74	45.62
Rock	0	0	0	0
Pavement	0	0	.00	.00
Litter	42.00	25.71	24.92	20.39
Cryptogams	.75	2.11	5.05	9.43
Bare Ground	48.75	33.26	54.67	34.37

SOIL ANALYSIS DATA --
Herd Unit 13B, Study # 5, Study Name: Buckhorn Draw

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	ppm P	ppm K	dS/m
18.9	60.4 (18.0)	7.6	64.0	18.0	18.0	0.3	2.3	99.2	0.6



PELLET GROUP DATA --
Management unit 13B, Study no: 5

Type	Quadrat Frequency		
	'95	'00	'05
Rabbit	21	19	30
Elk	2	1	2
Deer	28	23	21
Cattle	5	9	23

Days use per acre (ha)	
'00	'05
-	-
1 (2)	3 (8)
27 (67)	20 (50)
20 (49)	6 (16)

BROWSE CHARACTERISTICS --
Management unit 13B, Study no: 5

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Artemisia tridentata wyomingensis												
86	**499**	66	66	233	200	-	13	87	40	-	0	11/13
95	**1020**	200	340	560	120	40	47	6	12	8	8	16/24
00	**1160**	-	180	880	100	40	24	9	9	2	2	17/22
05	**660**	-	140	260	260	260	30	55	39	15	15	15/21
Chrysothamnus nauseosus												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**0**	-	-	-	-	-	0	0	-	-	0	6/14
05	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Chrysothamnus viscidiflorus stenophyllus												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**0**	-	-	-	-	-	0	0	-	-	0	18/35
05	**0**	-	-	-	-	-	0	0	-	-	0	13/15
Coleogyne ramosissima												
86	**166**	-	-	166	-	-	0	100	-	-	0	15/31
95	**60**	-	20	40	-	-	33	0	-	-	0	27/50
00	**160**	-	40	120	-	-	0	0	-	-	0	21/36
05	**120**	-	20	100	-	-	17	0	-	-	0	19/38
Ephedra viridis												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**0**	-	-	-	-	-	0	0	-	-	0	27/27
00	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**0**	-	-	-	-	-	0	0	-	-	0	25/31
Grayia spinosa												
86	**300**	-	-	-	300	-	0	100	100	-	100	-/-
95	**880**	-	-	600	280	-	66	16	32	11	27	17/33
00	**1020**	-	-	120	900	-	2	29	88	24	24	18/33
05	**820**	-	-	420	400	120	34	7	49	20	20	19/32
Gutierrezia sarothrae												
86	**7765**	-	866	5733	1166	-	.85	.42	15	-	0	9/5
95	**3260**	100	580	2680	-	-	0	0	0	-	0	11/15
00	**4060**	60	700	3140	220	840	0	0	5	5	5	6/8
05	**440**	-	20	420	-	60	0	0	0	-	0	9/10

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Juniperus osteosperma												
86	**33**	-	-	33	-	-	0	0	-	-	0	63/63
95	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Opuntia sp.												
86	**66**	-	-	66	-	-	0	0	0	-	0	4/6
95	**120**	-	-	120	-	-	0	0	0	-	33	6/17
00	**220**	-	-	220	-	-	0	0	0	-	0	7/12
05	**200**	-	-	140	60	-	0	0	30	30	30	7/25
Sclerocactus sp.												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**20**	-	20	-	-	-	0	0	-	-	0	5/3
05	**0**	-	-	-	-	-	0	0	-	-	0	6/7